

Electro-Osmotic Pulse to Control Mold Growth at Fort Sill

By Dana Finney and Vanessa Moll

A proven technology for drying up wet basements also looks promising for mold abatement. Electro-Osmotic Pulse (EOP) systems may stop mold growth by denying this organism the moisture it needs to sustain life.

EOP has been installed in numerous Army facilities, where it is successfully preventing moisture intrusion in basements and other below-grade structures. Research at the U.S. Army Engineer Research and Development Center (ERDC) has optimized the system for this use. Because it can control humidity in walls, EOP is now being demonstrated at Fort Sill, OK, as a means to mitigate mold.

“The medical community generally accepts that mold cannot grow where the relative humidity is below 55 percent,” said Vincent Hock, Researcher at ERDC’s Construction Engineering Research Laboratory (CERL). “We have achieved that level in several of our EOP installations.”

The danger of mold in buildings occupied by humans has only recently gained national attention through some well publicized crises. The most common health effect from mold growing in buildings is allergic reaction, but a host of other illnesses is possible, including mucous membrane irritation, infections, and toxicity.



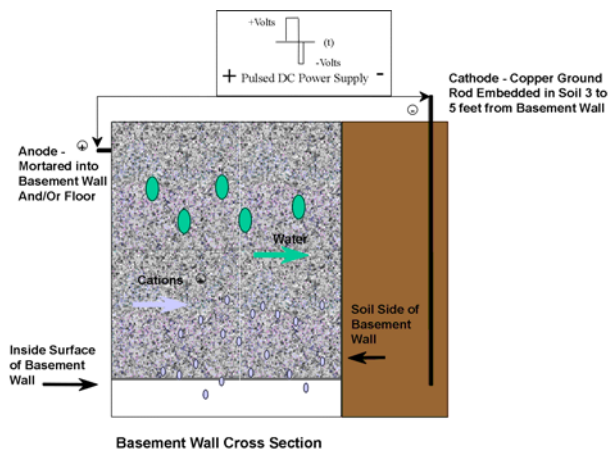
Mold and mildew can make you sick –literally.

MAJ Michael Jelen, engineer in the Directorate of Engineering at the National Defense University in Washington, DC, was so affected by the mold and humidity in his workplace that, “On hot days I had to leave because of so many allergic reactions...it became a mold factory,” he said.

Tom Critchfield, Chief, Engineering Plans and Services Division in the DPW at Fort Myer, VA, suggested that Jelen install EOP. The building with the mold problem is 170 years old and the brick walls in the basement act like “giant sponges,” causing water to wick up from the ground through the concrete foundation. “EOP seems to be a way to

stop it,” said Jelen. I’m sure that conventional water-proofing techniques wouldn’t fix the problem.” While the EOP unit is still being installed, he added, “I am optimistic about it.”

EOP works by embedding anodes into concrete or masonry walls, installing a copper ground rod through the building into the soil, and setting up a series of controlled electrical pulses, inducing electro-osmosis. In this process, cations travel toward the negative electrode in the earth against the normal flow of water molecules. When the walls reach a relative humidity which is so low that electric current can no longer pass through the concrete, the electric pulses cease. As water starts to flow back toward the interior, the humidity level increases to the point that the system turns on again.



Electro-Osmotic Pulse technology uses electric current to drive moisture out of concrete and masonry walls, creating a non-viable environment for mold.

CERL will assess EOP specifically for inhibiting mold in the Fort Sill demonstration. In 1996 the technology had been installed in three on-post family housing units that had seepage problems. According to Bryan Price, Assistant Chief of Housing at Fort Sill, since EOP was installed in those housing units “the air quality of basements has improved, and it has helped with mold problems.”

For the mold study, CERL will install EOP in the basements of several housing units and collect data from selected ones over a period of 2 years. The economics will also be documented. Conventional mold mitigation techniques can have astronomical costs. EOP may represent a lower cost alternative to these methods.

For more information about EOP, please contact Vincent Hock or Orange Marshall at CERL, 217-373-6753 or -6766, v-hock@cecer.army.mil or o-marshall@cecer.army.mil.

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